396. The method of Claim 384 wherein the substrate is contacted with silver stain to produce the detectable change.

372. The method of Claim 395 wherein the substrate is contacted with silver stain to produce the detectable change.

398. The method of Claim 384 wherein the detectable change is observed with an optical scanner

399. The method of Claim 398 wherein the device is a flatbed scanner.

400. The method of Claim 398 wherein the scanner is linked to a computer loaded with software capable of calculating greyscale measurements, and the greyscale measurements are calculated. to provide a quantitative measure of the amount of nucleic acid detected.

401. The method of Claim 384 wherein the oligonucleotides attached to the substrate are located between two electrodes, the nanoparticles are made of a material which is a conductor of electricity, and the detectable change is a change in conductivity.

402. The method of Claim 401 wherein the electrodes are made of gold, and the nanoparticles are made of gold.

403. The method of Claim 401 wherein the substrate is contacted with silver stain to produce the change in conductivity.

404. The method of Claim 397 wherein each of the plurality of oligonucleotides attached to the substrate in the array is located between two electrodes, the nanoparticles are

made of a material which is a conductor of electricity, and the detectable change is a change in conductivity.

405. The method of Claim 404 wherein the electrodes are made of gold, and the nanoparticles are made of gold.

406. The method of Claim 404 wherein the substrate is contacted with silver stain to produce the change in conductivity.

407. A method of detecting a nucleic acid having at least two portions comprising:

(a) contacting the nucleic acid with a substrate having oligonucleotides attached thereto, the oligonucleotides being located between a pair of electrodes, the oligonucleotides having a sequence complementary to a first portion of the sequence of said nucleic acid, the contacting taking place under conditions effective to allow hybridization of the oligonucleotides on the substrate with said nucleic acid;

(b) contacting said nucleic acid bound to the substrate with a first type of nanoparticles, the nanoparticles being made of a material which can conduct electricity, the nanoparticles having one or more types of oligonucleotides attached thereto, at least one of the types of oligonucleotides having a sequence complementary to a second portion of the sequence of said nucleic acid, the contacting taking place under conditions effective to allow hybridization of the oligonucleotides on the nanoparticles with said nucleic acid; and

(c) detecting a change in conductivity.

408. The method of Claim 407 wherein the substrate has a plurality of pairs of electrodes located on it in an array to allow for the detection of multiple portions of a single nucleic acid, the detection of multiple different nucleic acids, or both, each of the pairs of electrodes having a type of oligonucleotides attached to the substrate between them.

409. The method of Claim 407 wherein the nanoparticles are made of metal.

410. The method of Claim 407 wherein the nanoparticles are made of gold or silver.

411. The method of Claim 407 wherein the substrate is contacted with silver stain to produce the change in conductivity.

412. The method of Claim 407 further comprising:

(d) contacting the first type of nanoparticles bound to the substrate with a second type of nanoparticles, the nanoparticles being made of a material which can conduct electricity, the nanoparticles having oligonucleotides attached thereto, at least one of the types of oligonucleotides on the second type of nanoparticles comprising a sequence complementary to the sequence of one of the types of oligonucleotides on the first type of nanoparticles, the contacting taking place under conditions effective to allow hybridization of the oligonucleotides on the first and second types of nanoparticles; and

(e) detecting the change in conductivity.

413. The method of Claim 412 wherein at least one of the types of oligonucleotides on the first type of nanoparticles has a sequence complementary to the sequence of at least one of the types of oligonucleotides on the second type of nanoparticles and the method further comprises:

(f) contacting the second type of nanoparticles bound to the substrate with the first type of nanoparticles, the contacting taking place under conditions effective to allow hybridization of the oligonucleotides on the first and second types of nanoparticles; and

(g) detecting the change in conductivity.